A NEW RECORD AND HOST ASSOCIATION FOR THE PIGEONPEA POD FLY, *MELANAGROMYZA OBTUSA* (MALLOCH) (DIPTERA: AGROMYZIDAE) AND NOTES ON ITS PARASITOIDS IN THE NORTHERN TERRITORY, AUSTRALIA

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Abstract

The pigeonpea pod fly, *Melanagromyza obtusa* (Malloch), is recorded for the first time from the Northern Territory. This is also the first time it has been found feeding on the native legume *Cajanus latisepalus* (S.T. Reynolds & Pedley) Maesen and the first record of a host association for *M. obtusa* in Australia. Two parasitoids, *Callitula* sp. (Hymenoptera: Pteromalidae) and *Ormyrus* sp. (Hymenoptera: Ormyridae) were reared from *M. obtusa* on *C. latisepalus* pods.

Introduction

The pigeonpea pod fly, *Melanagromyza obtusa* (Malloch), is one of the most damaging pests of pigeonpea, *Cajanus cajan* (L.) Millsp. (Shanower *et al.* 1998). It is recorded as native to Australia (AICN 2004) and is also widely distributed throughout Asia, from Japan and Pakistan to Papua New Guinea (Shanower *et al.* 1998). *M. obtusa* is currently causing significant damage to this important crop in the Caribbean, including Puerto Rico and the Dominican Republic. Surveys were conducted in the tropical savannah of the Northern Territory in Australia to search for pod fly parasitoids to support a biological control program in the Caribbean.

Materials and methods

Two surveys of the mature green and brown pods of *Cajanus* species native to the Northern Territory were conducted in March and May 2004. These surveys resulted in five collections of pods from *C. cinereus* (F. Muell. Ex Benth.) F. Muell., five from *C. marmoratus* (R. Br. Ex Benth.) F. Muell., four from *C. latisepalus* (S.T. Reynolds & Pedley) Maesen, four from *C. reticulatus* (Dryander) F. Muell. and one each from *C. acutifolius* (F. Muell. Ex Benth.) Maesen and *C. scarabaeoides* (L.) Thouars.

The pods collected in the surveys were shipped to quarantine facilities in Puerto Rico and the Dominican Republic to isolate and rear parasitoids of *M. obtusa*. Pods of all *Cajanus* species collected in March were shipped, while

only *C. latisepalus* pods were shipped following the May survey. Small subsamples of most collections were retained at the Australian Biological Control Laboratory (ABCL) in Brisbane, Queensland.

Before the May shipment, 180 brown *C. latisepalus* pods from each of three collection sites were randomly selected to assess the level of damage by *M. obtusa*. The presence or absence of holes, similar to those formed by *M. obtusa*, was recorded for each pod. In order to develop an understanding of the biology of *M. obtusa* on *C. latisepalus*, 100 of the pods retained at ABCL were dissected once emergence had ceased. Voucher specimens of *M. obtusa* were forwarded to Don Colless for identification. Molecular sequencing of the CO2 gene was used for genetic comparison of *M. obtusa* from the Northern Territory and Puerto Rico.

Results

Melanagromyza obtusa was only reared from pods of *C. latisepalus*. Genetic comparison of pod flies collected from the Northern Territory with those from Puerto Rico revealed about a 7% variation over a 450 base fragment of the mitochondrial CO2 gene, likely representing population level differences (unpublished data). Two species of hymenopteran parasitoids also emerged from the *C. latisepalus* pods retained at ABCL: *Callitula* sp. (Pteromalidae) and *Ormyrus* sp. (Ormyridae).

During the May survey, all three collections of *C. latisepalus* pods, from the Meningen turnoff, Victoria Highway (15°27.92'S, 131°24.12'E), the Escarpment Walk, Gregory National Park (15°36.45'S, 131°06.89'E) and along the Buchanan Highway (15°56.50'S, 130°38.60'E), showed evidence of *M. obtusa* attack. Emergence holes similar to those formed by *M. obtusa* were observed in 56.1% of the pods from Meningen, 79.4% from the site along the Buchanan Highway and 88.9% of pods from the Escarpment Walk site. Not all exit holes were caused by *M. obtusa* as a single lepidopteran adult was reared from *C. latisepalus* pods kept at ABCL, although no larvae were observed. Over the same period, 84 *M. obtusa* were reared from the pods, suggesting that the pod fly accounted for the majority of damage observed in these collections. Dissections of 157 *C. latisepalus* pods, all the material retained at ABCL, revealed 124 with empty *M. obtusa* pupal cases. Usually a single *M. obtusa* larva fed on both seeds within a pod, although complete development on a single seed was observed.

Discussion

Cajanus latisepalus is a spreading shrub to 1 m high, with oblong pods of about 1.7 x 0.8 cm in size, densely covered in soft unmatted pale hairs and usually containing two seeds (Reynolds and Pedley 1981). It was the only host of *M. obtusa* observed. Nine species of *Cajanus* are listed as endemic to the Northern Territory (Northern Territory Parks and Wildlife 2003). The present surveys failed to find evidence of pod fly damage on five of these

species: *C. acutifolius*, *C. cinereus*, *C. marmoratus*, *C. reticulatus* and *C. scarabaeoides*. Three other species were not surveyed. In contrast, Shanower *et al.* (1998) reported *M. obtusa* on six species of *Cajanus* in India.

In Australia, *M. obtusa* has only previously been recorded from Queensland (AICN 2004). This is the first record from the Northern Territory. Considering the number of *M. obtusa* found in our surveys, it seems likely that it will occur throughout the native range of *C. latisepalus*, which is centred on the tropical savannah around the northern border of the Northern Territory and Western Australia. *C. latisepalus* was not previously known as a host for *M. obtusa*. Previous collections of *M. obtusa* in Queensland do not list any host information (Don Colless, pers. comm.), so it is likely that this is the first record of a host association for *M. obtusa* in Australia.

Of the two parasitoids reared from *M. obtusa* on *C. latisepalus*, *Callitula* sp. is an unrecorded association. Species of *Callitula* are parasites of small Diptera, especially Agromyzidae (Bouček 1988). Bouček (1988) reported that, in tropical countries, the main hosts of *Callitula* seem to be leaf-mining or stem-mining species on herbaceous plants. This is the first pteromalid recorded from *M. obtusa*.

A single species of *Ormyrus* has been reared previously from *M. obtusa*: *O. orientalis* (Walker) (Narendran 1999). *Ormyrus fredricki* Narendran & Sumodan has also been recorded attacking *M. obtusa* (Narendran *et al.* 1990, Shanower *et al.* 1998), but this species is now considered a junior synonym of *O. orientalis* (Narendran 1999). Narendran (1999) recorded 11 species of *Ormyrus* from Australia, although none are known from the Northern Territory. The *Ormyrus* species reared in this study does not run to any of the described Australian species in Narendran's (1999) key.

The discovery of *M. obtusa* on *C. latisepalus* in the Northern Territory and the collection of two parasitoids, extends knowledge of the native range and natural enemies of the pigeonpea pod fly. More importantly, it provides a potential source of new biological control agents for the management of *M. obtusa* as a pest of pigeonpea in the Caribbean and possibly India.

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